REMARKS/ARGUMENTS

Applicants have received and carefully reviewed the Office Action of the Examiner mailed November 2, 2006. Claims 1-42 remain pending, with clams 11-21 and 31-42 withdrawn from consideration. Reconsideration and reexamination are respectfully requested.

Drawing Objection

The Examiner objects to the drawings as not showing the connection between the ratio control mechanism and the phased heater array. Applicants submit that Figure 2 shows the ratio control 490 connected to the concentrator 124 and separator 126 through the controller 130. The phased heater array includes a plurality of heating elements in the concentrator and separator. Figure 2 thus shows the ratio control mechanism connected to the phased heater array. Withdrawal of the rejection is respectfully requested.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 1-10 are rejected as being indefinite for reciting "connected." The Examiner has interpreted "connected" to mean directly or indirectly connected. This interpretation is correct. Applicants submit that one of ordinary skill in the art would understand the use of "connected" in the claims and specification as including either direct or indirect connections, as indicated by the Examiner. Withdrawal of the rejection is respectfully requested.

Rejection under 35 U.S.C. § 103(a)

Claims 1, 2, 5, 6, 22-24, 28, and 30 are rejected as being unpatentable over Bonne (US 6,393,894). The Examiner asserts that Bonne teaches the invention substantially as claimed except for a plurality of heater elements in the separator. The Examiner appears to acknowledge that Bonne teach a single heating element in the separator, but then asserts that Bonne teach a ratio control mechanism 180 for changing the ratio of concentrator heating elements relative to separator heating elements. Applicants respectfully traverse the rejection. Bonne appears to teach a sensor assembly control block 180 that controls the timing of the plurality of heating elements in the concentrator and the single heater in the separator. See column 7, line 36 through column 8, line 37. While the controller 180 of Bonne appears to control the timing of the heating elements in the concentrator, there is no motivation for one of ordinary skill in the art to modify the controller to control a ratio because only one separator heater is taught, thus no ratio of concentrator heating elements to separator heating elements could be achieved.

The Examiner asserts that Figure 8 of Bonne shows a ratio control mechanism 180 changing the ratio of active concentrator heater elements to separator heating elements from 1:1 to 0:1. Applicants respectfully disagree. Bonne teaches:

> Thereafter, the sensor assembly control block 180 notifies heater control block 166 to begin heating the heater elements in a time phased sequence. The heater control block 166 first provides a first heater enable signal 194 and a separation heater enable signal 196, as better shown in FIG. 8. The first heater enable signal 194 turns on transistor 168a, and the

> separation heater enable signal 196 turns on transistor 170.

Emphasis added; see column 7, lines 36-43. Boone appears to teach the controller 180 as turning on the first concentration heater and the single separation heater at the same time, and then sequentially turning on the remaining concentration heaters. See Figure 8. It is unclear upon what the Examiner based the interpretation of Boone teaching changing a ratio of active concentrator heater elements to separator heating elements from 1:1 to 0:1. If this rejection is maintained, Applicants respectfully request the Examiner point out where in Boone such a teaching is found.

The Examiner also asserts that Boone teaches a micro discharge mechanism located proximate to the first detector, pointing to the outlet below part 264 in Figure 9, and column 4, lines 14-19. Applicants respectfully traverse the rejection. Boone appears to teach a single detector 264 in figure 9. Column 4, lines 14-19 of Boone state:

> The process of forming channel 32 may be similar to that used to form the microbridge system illustrated in U.S. Pat. No. 4,944,035 to Aagardl et al., which is incorporated herein by reference. The channel includes an entry port 34 and an exhaust port 36.

This portion of Boone does not appear to teach anything regarding a micro discharge mechanism proximate the first detector, as is recited in claim 2.

The Examiner acknowledges that Boone does not teach a plurality of heater elements in the separator, but asserts that the mere duplication of parts has not patentable significance

unless a new and unexpected result is produced. The Examiner then asserts that the single separation heater separates the constituent gasses into individual components, and the use of a plurality of separation heater elements would be expected to provide a more precise separation of components, which would have been obvious to one of ordinary skill in the art.

Applicants respectfully disagree. The plurality of heating elements in the separator are not mere duplicates. The presence of the plurality of separator heating elements in combination with the plurality of concentrator heating elements and the ratio control mechanism provides versatility to the fluid sensor by allowing the ratio of concentrator heating elements relative to separator heating elements to be changed. Changing the ratio allows different concentrator and different separator heating elements to be utilized, which allows different groups of gases to be separated and detected. For example, see the specification at page 19, line 18 through page 20, line 12. Further, Applicants submit that there is no motivation for one of ordinary skill in the art to modify the sensor of Boone by adding separator heating elements and a ratio control mechanism. The only motivation for making such a change appears to be found in Applicants' specification, which is improper.

Additionally, even if one were to duplicate the single separator heating element of Boone, one would not arrive at the claimed fluid sensor because Boone also fails to teach a ratio control mechanism as indicated above. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1, 2, 22-24, 28, and 30 are rejected as being unpatentable over Geis (US 6,413,781) in view of Manginell (US

6,666,907). The Examiner acknowledges that Geis fails to teach a separator unit containing a plurality of heater elements or a ratio control mechanism. The Examiner asserts that Manginell teaches a separator comprising a plurality of heating elements. The Examiner then asserts that because the Manginell separator device is microfabricated, it is compatible with the Geis device, and it would have been obvious for one of ordinary skill in the art to combine the Geis concentrator device with the Manginell separator device to gain the advantages of the faster, low power and sensitivity temperature programming for separation. Applicants respectfully traverse the rejection.

As the Examiner acknowledged, Geis does not appear to teach a separator of any type, let alone a separation containing a plurality of heating elements or a ratio control mechanism as claimed. The purpose of the Geis pump appears to be to move a chemical constituent along a pathway by applying a time-varying temperature profile along the pathway. Geis appears to teach a plurality of eating elements 90 positioned along the pathway 82 leading to a channel 95 into the sensing device 99. See column 7, lines 8-33. There does not appear to be any teaching, suggestion, or motivation for adding a separator to the pump device of Geis. Further, Geis teaches their device as "preferentially conveying the target constituent forward" and "particularly advantageous when used in conjunction with a fluid phase detector, for example an ion-mobility spectrometer." See column 3, lines 38-39 and 56-59. Geis thus appears to teach their concentrator as suitable for use in combination with a detector, but appears to suggest that the concentrator itself provides the separation of the target constituent. Thus, there

does not appear to be any motivation for one of ordinary skill in the art to combine the concentrator of Geis with a gas chromatography column such as that taught by Manginell.

Additionally, even if one were to combine the devices of Geis and Manginell, one would not arrive at the claimed fluid sensor because neither Geis nor Manginell appears to teach or suggest a ratio control mechanism as is recited in the claims. Further, the Examiner has not addressed the ratio control mechanism element of the claimed fluid sensor in the rejection. The combination of Geis and Manginell thus fails to teach or suggest each and every element of the independent claims or the claims dependent thereon. Additionally, there is no motivation for one of ordinary skill in the art to modify the devices of Geis and Manginell to achieve the instant invention. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 3-10, 25-27, and 29 are rejected as being unpatentable over Geis and Manginell in view of Kubisiak (US 6,169,965). Claims 5-7 are also rejected as being unpatentable over Geis and Manginell in view of Kubisiak and further in view of Geis. The Examiner acknowledges that Geis and Manginell fail to teach a second detector or a flow sensor, or a processor on a separate board from the concentrator, separator and phased heater array. Kubisiak is cited for teaching a detector and flow sensor connected to a processor comprising switches and control logic, where the detector is used to measure fluid properties. The Examiner asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the devices of Geis and Manginell

with the processor and switches of Kubisiak in order to control the timing of the activation of the different heating elements and to gain the additional advantage of determining the phase lag and fluid properties. Applicants respectfully traverse the rejection.

For at least the reasons set forth above, Geis and Manginell do not appear to teach the basic elements of independent claims 1 and 22, from which claims 3-10 and 25-29 depend. Kubisiak does not appear to provide what Geis and Manginell lack, thus any combination of Geis, Manginell and Kubisiak also fails to teach each and every element of the claims.

Geis appears to teach a device for separating target constituents according to their molecular weights by moving the chemicals along a temperature gradient. Manginell appear to separate chemical constituents based on the chemical equilibria between a mobile phase and a stationary phase in a GC column. Kubisiak appears to teach a device for determining thermal conductivity, thermal diffusivity, specific heat and velocity of a fluid of interest. Applicants submit that there is no motivation for one of ordinary skill in the art to modify the device of Geis or Manginell using the device of Kubisiak because the devices appear to have different functions, different components and different modes of operation. Applicants submit that there is no indication in Geis or Manginell that determining the phase lag and fluid properties, as taught by Kubisiak, would be advantageous or even useful.

In response to Applicants' arguments, the Examiner asserts that Kubisiak teaches that the fluid velocity can be determined

by knowing the distance between the heater element and the sensor element as well as the contribution of thermal diffusivity. The Examiner acknowledges that Geis does not claim a specific sensor and thus does not teach a particular distance between the heater elements an a sensor. The Examiner then asserts that the combination of Geis and Manginell creates an apparatus with a determinable distance between the heater elements and the sensor element, and that Kubisiak suggests the use of a flow sensor with a device such as the combined Geis and Manginell device in order to gain the advantages of determining fluid velocity. Applicants do not understand the relevance of the argument because Geis (the primary reference) is not concerned with fluid velocity and the Examiner has not provided any reasoning for why one of ordinary skill in the art would want to modify the Geis device to measure fluid velocity. MPEP 2143.01 III states:

> "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)… Although a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.' 916 F.2d at 682, 16 USPQ2d at 1432.)."

Applicants submit that none of the references provides any indication of the desirability of their combination.

Further, even if one were to combine the teachings of Geis, Manginell and Kubisiak, one would not arrive at the claimed invention. None of the references appear to teach or suggest a fluid sensor having a first plurality of heating elements in a

concentrator and a second plurality of heating elements in a separator, or a ratio control mechanism as claimed. Reconsideration and withdrawal of the rejection are respectfully requested.

Reconsideration and reexamination are respectfully requested. It is submitted that, in light of the above remarks, all pending claims should now be in condition for allowance. If a telephone interview would be of assistance, please contact the undersigned attorney at 612-677-9050.

Respectfully submitted,

Dated: 01-02-07

John G. Shudy, Jr., Reg. No. 31,214
CROMPTON, SEAGER & TUFTE, LLC
1221 Nicollet Avenue, Suite 800
Minneapolis, MN 55403-2402
Telephone: (612) 677-9050
Facsimile: (612) 359-9349